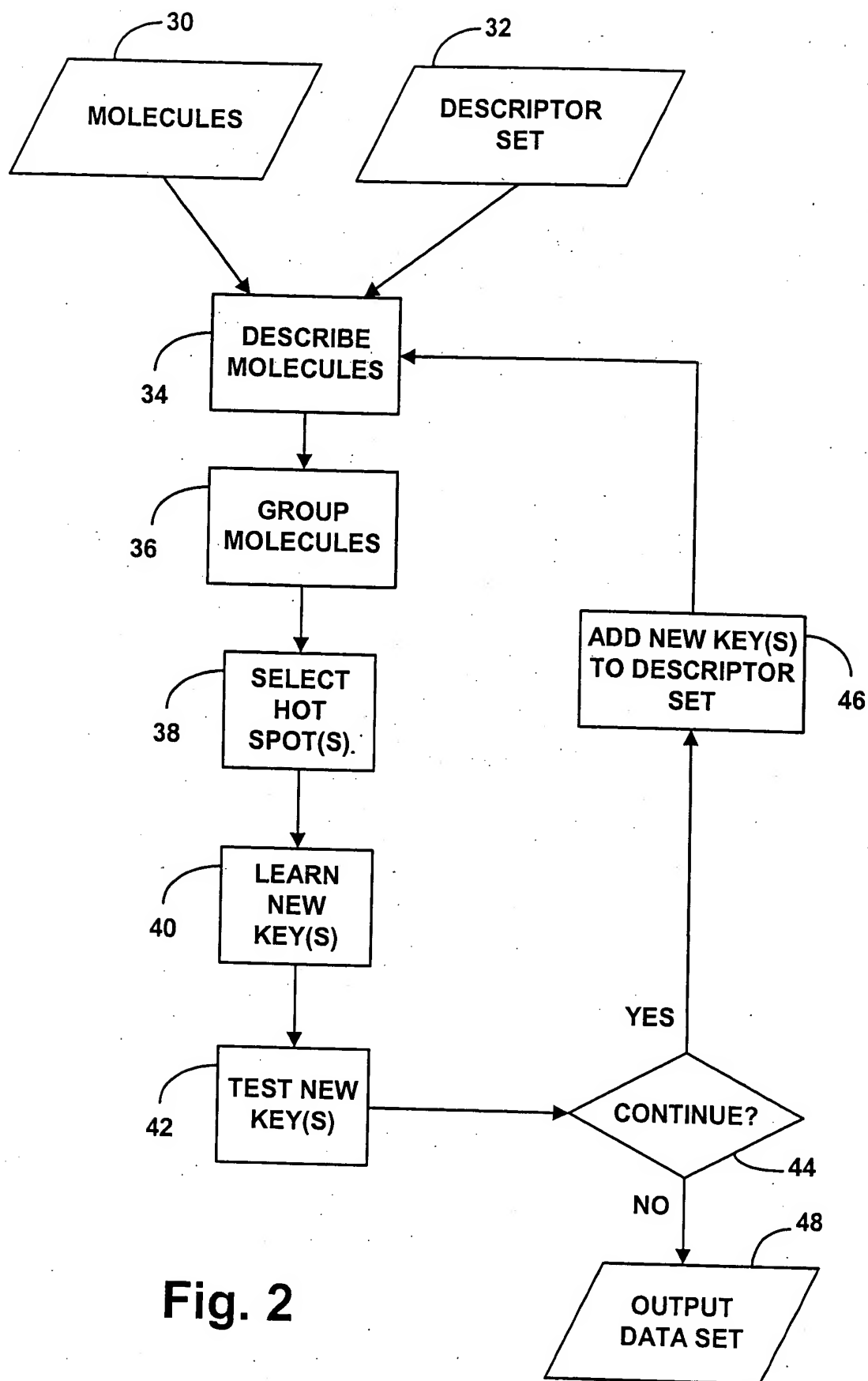


**Fig. 1**



**Fig. 2**

# Figure 3a

Exemplary Starting Keys			
SMARTS Query	Minimum hits	Weight	Comment and corresponding MACCS definition, if any
[R2;r5]~[R2;r5]	1	7	1 Any double ring, structure with the smallest ring a 5 member ring
[R2;r6]~[R2;r6]	1	7	2 Any double ring structure with the smallest ring a 6 member ring
[!#6;r4][r4][r4][r4]	1	100	3 QAAA@1
[#4,#12,#20,#38,#56,#88]	1	100	4 Group IIA
[r4]	1	100	5 4 M. ring
[#29,#30,#47,#48,#79,#80]	1	95	6 group IB, IIB
[#8]~[#7](~[#6])~[#6]	1	100	7 ON(C)C
[#16]~[#16]	1	100	8 S-S
[#8]~[#6](~[#8])~[#8]	1	100	9 OC(O)O
[!#6]1~*~*1	1	100	10 QAA@1
C#C	1	85	11 CTC
[#5,#13,#31,#49,#81]	1	76	12 Group IIIA
[r7]	1	90	13 7 M ring
[#14]	1	40	14 Si
[#6]=[#6](~[!#6])~[!#6]	1	56	15 C=C(Q)Q
[r3]	1	80	16 3 M ring
[#7]~[#6](~[#8])~[#8]	1	18	17 NC(O)O
[#7]~[#8]	1	9	18 N-O
[#7]~[#6](~[#7])~[#7]	1	45	19 NC(N)N
[#6;R]=[#6;R](@*)@*	1	35	20 C\$=C(\$A)(\$A)
[#53]	1	40	21 I
[!#6][CH2][!#6]	1	57	22 QCH2Q
[#15]	1	20	23 P
[#6]~[!#6](~[#6])(~[#6])~*	1	29	24 CQ(C)(C)A
[!#6]~[#9,#17,#35,#53]	1	23	25 QX
[#6]~[#16]~[#7]	1	50	26 CSN
[#7]~[#16]	1	46	27 NS
[CH2]=,*	1	26	28 CH2=A
[#16;r]	1	30	29 S heterocycle
[#7]~[#6](~[#8])~[#7]	1	12	30 NC(O)N
[#7]~[#6](~[#6])~[#7]	1	20	31 NC(C)N
[#8]~[#16](~[#8])~[#8]	1	25	32 OS(O)O
[#16]~[#8]	1	25	33 S-O
C#N	1	24	34 CTN
[#9]	1	12	35 F
[!#6;H1,H2,H3]~*~[!#6;H1,H2,H3]	1	10	36 QHAQH
[#6]=[#6]~[#7]	1	14	37 C=CN
[#35]	1	14	38 Br
[#16]~*~[#7]	1	15	39 SAN

### Figure 3b

<b>Exemplary Starting Keys Cont.</b>			
<b>SMARTS Query</b>	<b>Minimum hits</b>	<b>Weight</b>	<b>Comment and corresponding MACCS definition, if any</b>
[#8]~[!#6](~[#8])~[#8]	1	10	40 OQ(O)O
[-,-,--,+,++,+++]	1	6	41 charge
[#6]=[#6](~[#6])~[#6]	1	11	42 C=C(C)C
[#6]~[#16]~[#8]	1	14	43 CSO
[#7]~[#7]	1	12	44 NN
[!#6;H1,H2,H3]~*~*[!#6;H1,H2,H3]	1	10	45 QHAAAQH
[!#6;H1,H2,H3]~*~*[!#6;H1,H2,H3]	1	8	46 QHAAQH
[#8]~[#16]~[#8]	1	13	47 OSO
[#8]~[#7](~[#8])~[#6]	1	11	48 ON(O)C
[#8;r]	1	8	49 O heterocycle
[!#6]~[#16]~[!#6]	1	12	50 QSQ
[#16]!:.*	1	12	51 Snot%A%A
[#16]=.[#8]	1	13	52 S=O
*~[#16](~*)~*	1	12	53 AS(A)A
*@*!@*@*	1	11	54 A\$A!A\$A
[#7]=.[#8]	1	11	55 N=O
*@*!@[#16]	1	11	56 A\$A!S
[#6]:[#7]	1	12	57 C%N
[#6][#6]([#6])([#6])*	1	9	58 CC(C)(C)A
[!#6]~[#16]	1	11	59 QS
[!#6;H1,H2,H3]~[!#6;H1,H2,H3]	1	8	60 QHQH(&..)
[!#6]~[!#6;H1,H2,H3]	1	8	61 QQH
[!#6]~[#7]~[!#6]	1	9	62 QNQ
[#7]~[#8]	1	9	63 NO
[#8]~*~*~[#8]	1	7	64 OAAO
[#16]=.*	1	8	65 S=A
[#6H3]~*~[#6H3]	1	6	66 CH3ACH3
*!@[#7]@*	1	8	67 A!N\$A
[#6]=[#6](~*)~*	1	6	68 C=C(A)A
[#7]~*~[#7]	1	5	69 NAN
[#6]=[#7]	1	6	70 C=N
[#7]~*~*~[#7]	1	6	71 NAAN
[#7]~*~*~*~[#7]	1	6	72 NAAAN
[#16]~*(~*)~*	1	7	73 SA(A)A
*~[#6H2]~[!#6;H1,H2,H3,H4]	1	6	74 ACH2QH
[!#6;!#1;r5]1~[r5]~[r5]~[r5]~[r5]1	1	5	75 QAAAA@1
[#7;H2,H3,H4]	1	6	76 NH2
[#6]~[#7](~[#6])~[#6]	1	5	77 CN(C)C
[#6;H2,H3]~[!#6]~[#6;H2,H3]	1	5	78 CH2QCH2
[#9,#17,#35,#53]!:@*@*	1	4	79 XIA\$A

### Figure 3c

<b>Exemplary Starting Keys Cont.</b>			
<b>SMARTS Query</b>	<b>Minimum hits</b>	<b>Weight</b>	<b>Comment and corresponding MACCS definition, if any</b>
[#16]	1	5	80 S
[#8]~*~*~*~*~*~*~*~*~*~*~*~*~*	1	4	81 OAAAO
[!#6;H1,H2,H3]~*~*~*~*~*~*~*~*~*~*~*~*~*	1	4	82 QHAACH2A
[!#6;H1,H2,H3]~*~*~*~*~*~*~*~*~*~*~*~*~*	1	4	83 QHAAACH2A
[#8]~[#6](~[#7])~[#6]	1	4	84 OC(N)C
[!#6;!#1]~[CH3]	1	4	85 QCH3
[!#6;!#1]~[#7]	1	4	86 QN
[#7]~*~*~*~*~*~*~*~*~*~*~*~*~*	1	4	87 NAAO
[r5]	1	4	88 5M ring
[#7]~*~*~*~*~*~*~*~*~*~*~*~*~*	1	5	89 NAAAO
[!#6]1~*~*~*~*~*~*~*~*~*~*~*~*~*	1	5	90 QAAAAA@1
[#6]=[#6]	1	4	91 C=C (does not hit aromatic)
*~[#6H2]~[#7]	1	4	92 ACH2N
[r8,r9,r10,r11,r12,r13,r14]	1	4	93 8M ring or larger
[!#6]~[#8]	1	3	94 QO
[#17]	1	4	95 CL
[!#6;H1,H2,H3]~*~*~*~*~*~*~*~*~*~*~*~*~*	1	4	96 QHACH2A
@*(*)@*	1	4	97 AS\$(A)\$A
[!#6;!#1]~*~*~*~*~*~*~*~*~*~*~*~*~*	1	2	98 QA(Q)Q
[#9,#17,#35,#53]~*~*~*~*~*~*~*~*~*~*~*~*~*	1	3	99 XA(A)A
[CH3]~*~*~*~*~*~*~*~*~*~*~*~*~*	1	4	100 CH3AAACH2A
*~[#6;H3,H2]~[#8]	1	4	101 ACH2O
[#7]~[#6]~[#8]	1	3	102 NCO
[#7]~*~*~*~*~*~*~*~*~*~*~*~*~*	1	4	103 NACH2A
*~*~*~*~*~*~*~*~*~*~*~*~*~*	1	3	104 AA(A)(A)A
[#8]!:.*	1	4	105 Onot%A%A
[CH3]~[#6;H2]~*	1	3	106 CH3CH2A
[CH3]~*~*~*~*~*~*~*~*~*~*~*~*~*	1	3	107 CH3ACH2A
[CH3]~*~*~*~*~*~*~*~*~*~*~*~*~*	1	3	108 CH3AACH2A
[#7]~*~*~*~*~*~*~*~*~*~*~*~*~*	1	2	109 NAO
*~[CH2][CH2]~*	3	3	110 ACH2CH2A > 1
[#7]=.*	1	3	111 N=A
[!#6&r]	2	3	112 heterocycle atom > 1 & other features
[#7&r]	1	4	113 N heterocycle
*~[#7](~*)~*	1	3	114 AN(A)A
[#8]~[#6]~[#8]	1	3	115 OCO
[!#6]~[!#6]	1	2	116 QQ
a	7	2	117 aromatic ring > 1
*![#8]!@*	1	2	118 A!O!A

# Figure 3d

Exemplary Starting Keys Cont.			
SMARTS Query	Minimum hits	Weight	Comment and corresponding MACCS definition, if any
*@*!@[#8]	2	2	119 A\$A!O > 1 & ...
*[CH2]*~*~*[CH2]*	1	3	120 ACH2AAACH2A
*~[#6&H2]*~*~[#6&H2]*~*	1	3	121 ACH2AACH2A
[!#6]~[!#6]	2	2	122 QQ > 1
[!#6;H1,H2,H3,H4]	2	2	123 QH > 1
[#8]~*[CH2]*	1	2	124 OACH2A
*@*!@[#7]	1	2	125 A\$A!N
[#9,#17,#35,#53]	1	2	126 X (halogen)
[#7]!:*~*	1	2	127 Nnot%A%A
[#8]=,*~*	2	2	128 O=A>1
[!#6&r]	1	3	129 heterocycle
[!#6]~[CH2]*~*	2	2	130 QCH2A>1 & ...
[#8;H1,H2]	1	2	131 OH
[#8]	4	2	132 O > 3 and other features ..
[CH3]	3	2	133 CH3 > 2
[#7]	2	2	134 N>1
*@*!@[#8]	1	2	135 A\$A!O
*!:*~*!~*	1	2	136 Anot%A%Anot%A
[r6]	7	2	137 6 M ring > 1
[#8]	3	2	138 O > 2
*~[CH2]~[CH2]*~*	1	2	139 ACH2CH2A
*~[!#6](~*)~*	1	2	140 AQ(A)A
[CH3]	2	2	141 CH3 > 1
*!@*~*!@*	1	2	142 A!A\$A!A
[#7;H1,H2,H3,H4]	1	2	143 NH
[#8]~[#6](~[#6])~[#6]	1	2	144 OC(C)C
[!#6][CH2]*	1	2	145 QCH2A
[#6]=,*~*O	1	1	146 C=O
*!@[CH2]!@*	1	1	147 A!CH2!A
[#7]~*(~*)~*	1	1	148 NA(A)A
[#6]-[#8]	1	1	149 C-O
[#6]-,*~*[#7]	1	1	150 C-N
[#8]	2	1	151 O > 1
[CH3]	1	1	152 CH3
[#7]	1	1	153 N
a	1	1	154 aromatic
[r6]	1	1	155 6 member ring
[#8]	1	1	156 O
R	1	1	157 ring

Fig. 4a

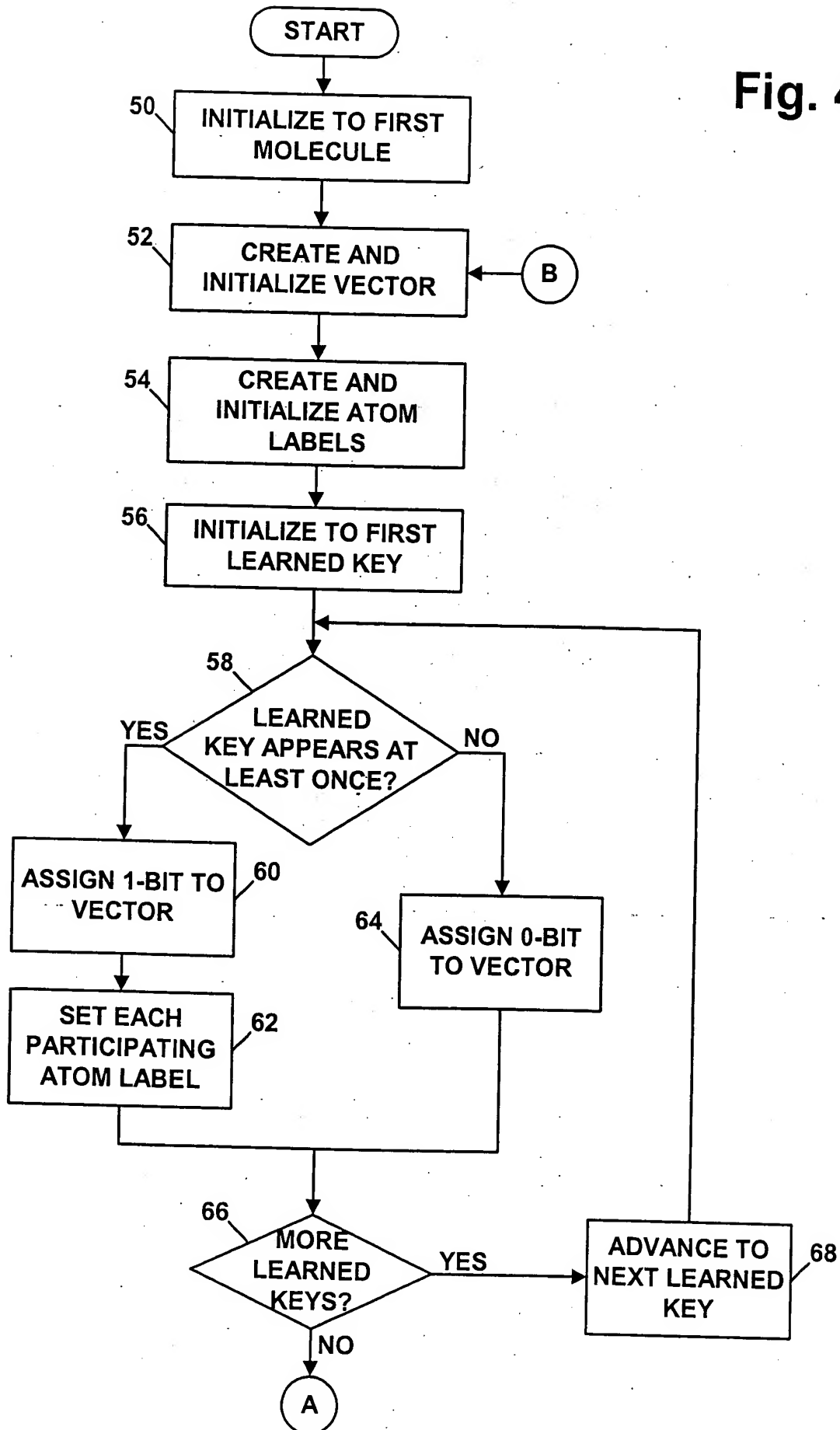
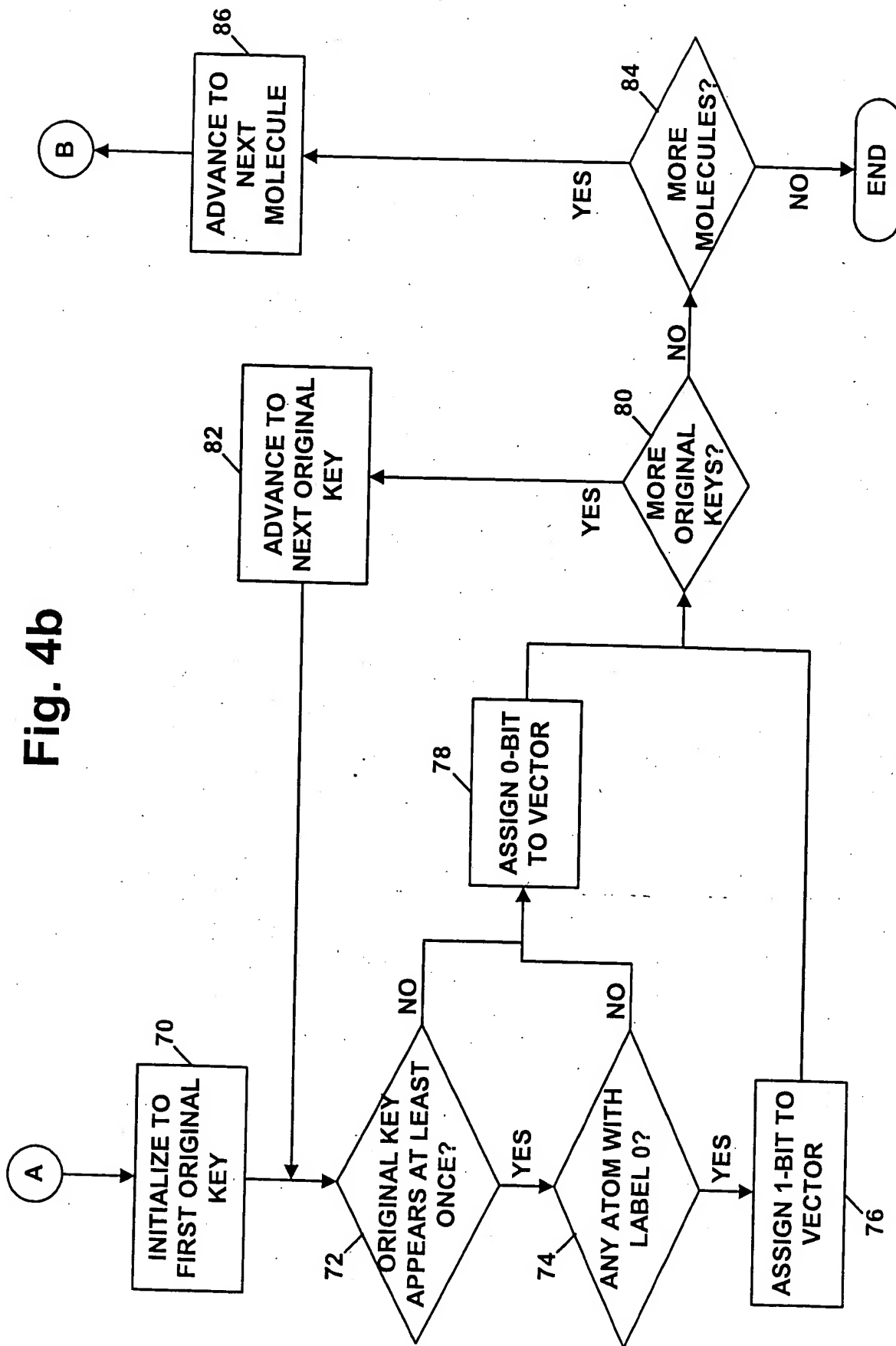


Fig. 4b





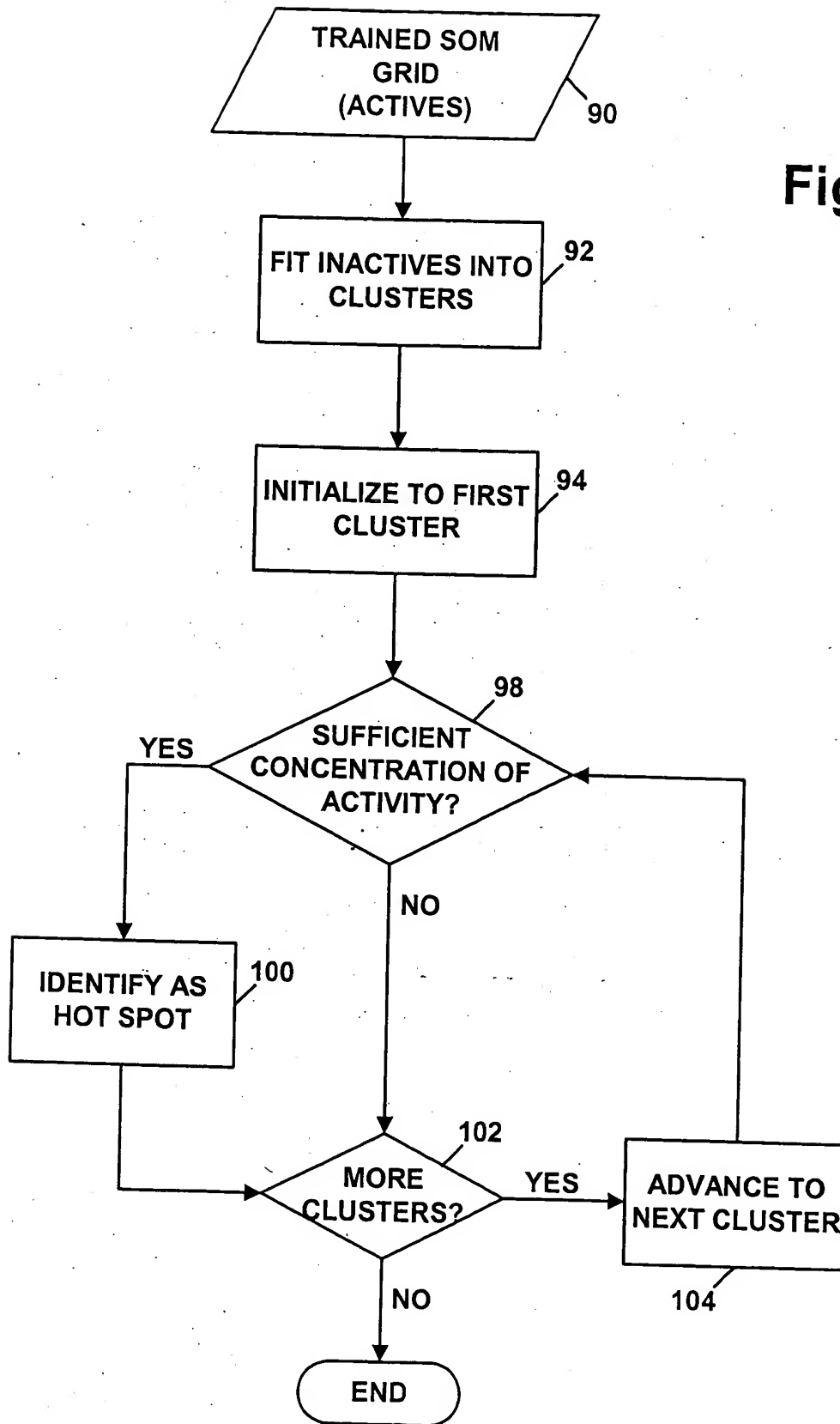


Fig. 6

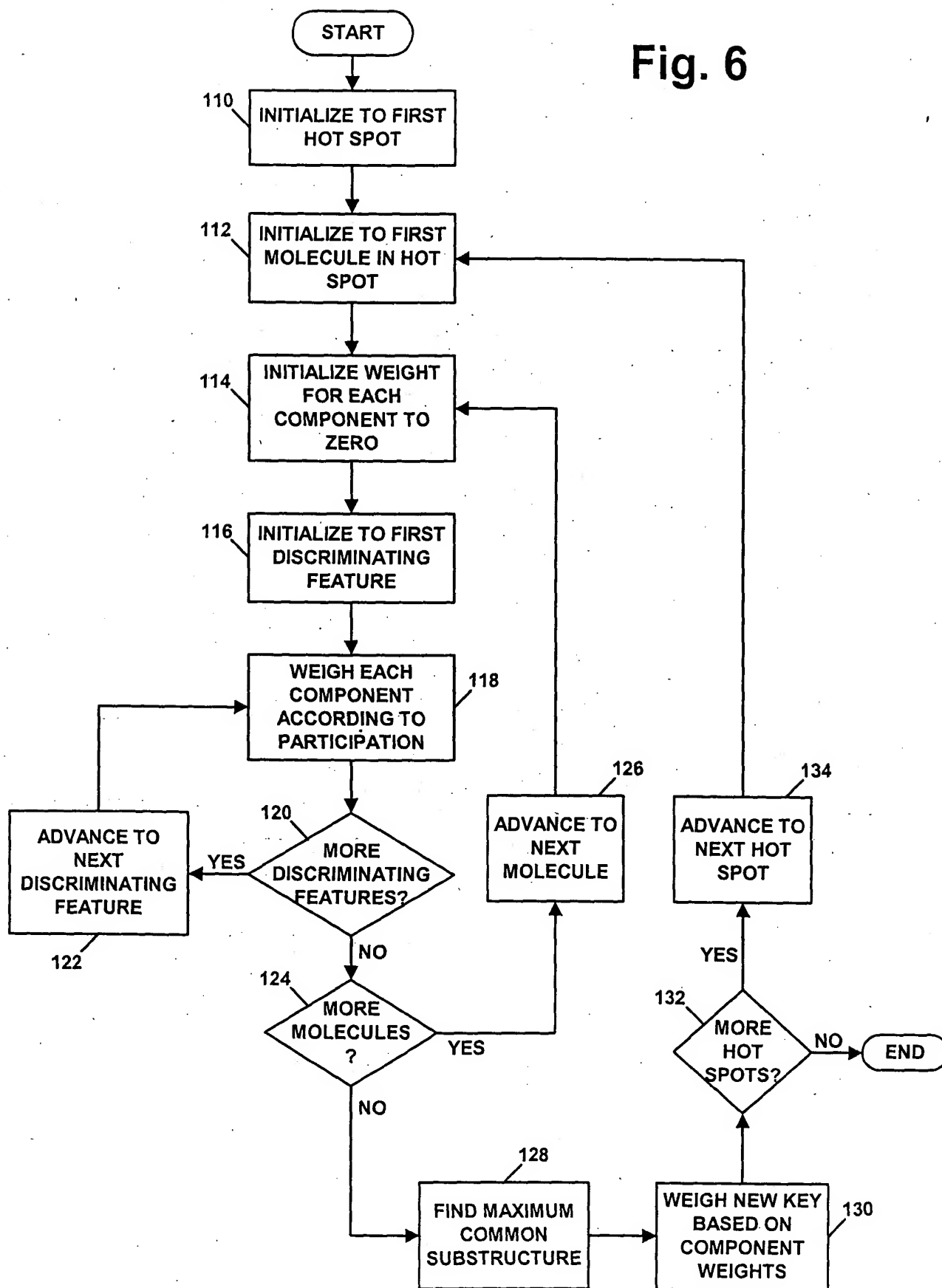


Fig. 7

